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Fisheries and Aquatics Bulletin

A publication of the U.S. Geological Survey, Fisheries: Aquatic and Endangered Resources (FAER) Program
Volume II, Issue 4
August 2003, Edited by Dale C. Honeyfield

From the Program Coordinator's Desk

A Special Thanks to Dale Honeyfield!
Following 30 days of a challenging and exciting detail as Acting Assistant FAER Program Coordinator in BRD headquarters, Dale headed back to the "Grand Canyon of the East" to his Wellsboro, Pa. Northern Appalachian Research Laboratory. The Wellsboro facility is part of the Leetown Science Center.

Dale was a tremendous asset to the Science Staff here in Reston, where he performed a variety of critical Program management and Administrative functions related to the FAER Program. Dale was instrumental in making site arrangements for the upcoming Advisory Committee meeting for the FAER Program five-year plan. He also presented an enlightening Bureau-wide seminar entitled "Thiamine Deficiency Complex – the Potential to Extirpate Populations" which highlighted a thiamine deficiency-thiaminase connection affecting salmonids in several ecosystems including the Great Lakes, New York Finger Lakes, and Baltic Sea.

Dale employed expert skills networking with the headquarters staff, partner Bureaus and other resource agencies in advancing the FAER Program. Dale also fiddled around quite a bit at HQ. Dale is an outstanding violinist and guitar player and he provided the staff with a couple sessions of fine Blue Grass music.

A special thanks to Steve Rideout, Supervisor, and Bill Palmisano, Leetown Science Center Director, for supporting Dale's detail to HQ.

Share Your Expertise
"FAB": *Fisheries and Aquatics Bulletin*
Thanks to all those who contributed material to this issue of the FAB. Remember, the FAB is a great opportunity to publish your fisheries and aquatic resource articles and other items of interest to gain national exposure.

To have your articles published in FAB, *Contact: Robin Schrock or Jim Preacher, FAER Program Coordinators.*

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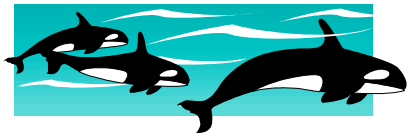
Thiamine Deficiency Complex: A Naturally occurring problem.

Thiamine deficiency in fish and aquatic animals has been identified in several geographical locations. Early life stage mortality in salmonids in the Laurentian Great Lakes and NY Finger Lakes is an example and a significant problem. The mortality of swim-up fry dying from early mortality syndrome (EMS), a non-infectious disease ranges from 0 to 100% depending upon the lake, the salmonid species, stock within a species, and year. The syndrome is characterized by lack of vitamin B1 (thiamine).

Adult salmonids feeding on prey species (alewife, rainbow smelt) containing thiaminase produce eggs low in thiamine and fry die between hatch and swim-up. Thiamine treatment of eggs or fry is effective but it is only practical in species that migrate to weirs where eggs are collected and reared in the hatchery. Since lake trout eggs are not collected, thiamine treatment is not an option. Characteristic thiamine deficiency brain lesions have been observed in lake trout that survived overt mortality and in Atlantic salmon from the Baltic Sea. In the Baltic region the malady is called M74. Recent data suggests that thiamine deficiency affects neural function (visual acuity). Both predator avoidance and prey capture were found to be impaired in lake trout fry with low thiamine. Data also show that adult coho salmon, steelhead trout, and lake trout are dying as a result of thiamine deficiency. This has negative implication on sustaining adequate numbers of adult spawning animals. Thiaminase in alewives consumed by salmonids is highly variable. The cause of the variability is under investigation. Naturally occurring thiamine deficiency appears to be occurring in Florida alligators foraging on gizzard shad. The data suggest that thiamine deficiency in wild aquatic top predators is having a significant impact on sustainable reproduction of aquatic animals.
Contact: Dale C Honeyfield, 570-724-3322
honeyfie@usgs.gov



Bumper Stickers:

When the chips are down, the buffalo is empty

Everyone has a photographic memory. Some just don't have film.

Did you ever wonder how much deeper the ocean would be without sponges?

Reproductive Potential of Triploid Grass Carp

and Black Carp

Chinese carps, introduced into waters of the United States, have established self-sustaining populations in many areas. These exotic species have degraded and modified aquatic habitats thereby negatively impacting native fish and wildlife populations. Adverse effects of exotic or invasive species have been observed on both ecological and recreational uses of our aquatic resources. In fact, feral black carp have recently been captured in the Mississippi River. Investigations on-going at CERC have objectives to 1) compare the accuracy of methods used to verify triploidy; 2) evaluate the reproductive potential of triploid and diploid black and grass carps; and 3) determine population characteristics (growth and survival rates) of black carp.

Contact: Donald Tillitt, Columbia Environmental Research Center, U.S.Geological Survey,
4200 New Haven Rd., Columbia, MO, 65201
Phone: 573-876-1886
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Meeting Summary

Information presented at the 9th Annual INAD Coordination Workshop, July 30-31, 2003, Bozeman, MT.

Demonstration Database created for the Summary of Fish Production by Public Aquaculture Facilities in the U.S.

Bonnie Johnson and Dave Erdahl. U.S. Fish and Wildlife Service, AADAP Program; Roz Schnick, National Coordinator for Aquaculture New Animal Drug Applications, Michigan State University.

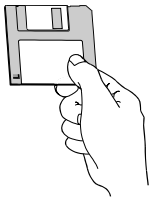
Abstract

The "Summary of Fish Production by Public Aquaculture Facilities in the U.S." database was created in response to an identified need by pharmaceutical companies for access to public fish production data. Such data would be extremely valuable to them for use in making "marketing decisions" concerning potential aquaculture products. Fish production summaries for either calendar year 2000 or 2001 were collected from state and tribal facilities, while similar FWS data were obtained from the "2001 Fish Egg and Fish Distribution Report". This information was entered into a specially designed database program using Microsoft Access. From this database, information could then be easily sorted, compiled, and queried to generate a variety of different reports detailing public fish production in the United States.

As of July 19, 2003, completed surveys had been received from 43 states, while a partial survey was received from 1 state. Six states have not responded to several separate survey requests. Based on number of fish produced, the number one salmonid species produced was chinook salmon (219 million), while the number one non-salmonid species was walleye (~1.1 billion). Based on pounds of fish produced, the number one salmonid species was rainbow trout (17.2 million), while the number one non-salmonid species was channel catfish (1.1 million). Although based on number of fish produced the production of non-salmonid fish species far exceeded that of salmonid species (2.0 billion vs 597.1 million), pounds of salmonid fish produced far exceeded pounds of non-salmonid fish produced (39.9 million vs 3.2 million). Approximately 2.5 billion fish were produced by state-operated fish hatcheries in 44 states, 133.8 million fish were produced by sixty-six FWS National Fish Hatcheries, and 28.1 million fish were produced by reporting tribal facilities. These numbers result in a grand total of ~2.6 billion fish produced, and a total weight of fish produced of ~ 43.1 million.

The data that have been collected can be generated into a number of different fish production reports. Report categories that have been created include: Production by Species, Production by Age, Production by Agency, and Rank. Current efforts should now focus on how to collect complete data for the 6 missing states and various tribal facilities, as well as how best to post this information on the internet for its intended use.

Data base URL
http://ag.ansc.purdue.edu/aquanic/jsa/aquadrugs/
Select: "Fish Production Database"



Bits and Pieces of Useful Information

SPLASH! the newsletter of the International Year of Freshwater 2003. Current issue online at www.wateryear2003.org.

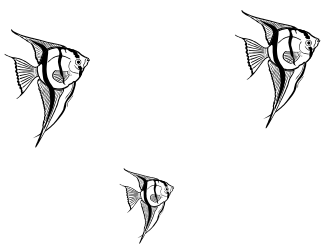
More on the forthcoming 2003 Banff Mountain Summit: Mountains as Water Towers, November 23-26, 2003 can be found at http://www.banffcentre.ca/mountainculture/mtnforum/econferences/

FISHING FOR NOVEL DRUGS

August 1, 2003 by Laura Spinney BioMedNet
http://news.bmn.com/news/story?day=030804&story=1

Marine cyanobacteria are unusual in that they generate molecules in which sub-units of fatty acids are structurally linked to amino acids. That polyketide-peptide backbone generates enormous chemical diversity, which American researchers are now beginning to mine for novel drug action. "There are just two microbial groups that really integrate those two types of pathways with the abundance and frequency that we see in cyanobacteria: the cyanobacteria and the myxobacteria," said Bill Gerwick, whose group at the College of Pharmacy, Oregon State University in Corvallis is now screening the products of cyanobacterial secondary metabolism for anti-cancer effects, among others.

They are also exploring novel 'tailoring' functions by which the cyanobacteria appear to modify the basic polyketide-peptide backbone of these metabolites. "After the backbone is made, these [tailoring functions] come in and create unusual little functional groups along it," said Gerwick. "In particular, we find abundant use of halogen atoms in cyanobacteria. So they incorporate chlorine, bromine and even iodine into some of these molecular structures, and they do so creating chemical functional groups that have really never been seen before in nature." Not surprisingly, it turns out that those novel functional groups have novel therapeutic actions. Having fractionated a crude organic extract from one Puerto Rican collection of the cyanobacterium Lyngbya majuscula, for instance, Gerwick's group succeeded in isolating three new secondary metabolites, including a tryptophan derivative, as well as several potent neurotoxins.



Summary of news from the Reston BRD Program Offices

IAFWA Briefing

AD Susan Hazeltine and the BRD Program Coordinators briefed the new Executive Secretary of the International Association of Fish and Wildlife Agencies, John Baughman, and staff assistant, Bob Miles on current USGS activities in relation to the needs of IAFWA members. The IAFWA represents federal, state, regional, and local fish and wildlife agencies and conservation organizations. Mr. Baughman inquired about areas of expertise in the USGS and emphasized that our interdisciplinary research and technology capabilities distinguish us from other agencies. BRD Program Coordinators presented

Science Support Projects

Rick Kearney is the new Science Support Project coordinator. Rick came from the IAFWA and is very interested in finding out about how the SSP project development takes place in different regions. I gave him a brief summary of my experience in Region 1, and he asked if the process was the same for all proposals. I asked if a one-page summary from our lab would be helpful, and he was very interested in a short narrative of: 1) how the need was first expressed by USFWS, 2) research design development, 3) identification of roles, 4) working relationships with the cooperators before and during the projects, 5) our changing role with USFWS (duplicated expertise) and 6) suggestions on how to improve the process. If you can provide me with a short summary of your experiences, I will compile them and send them back to you for editing, and get them to Rick, (say) by the first week in August. Heads-up – He also mentioned that there would soon be a call for SSP proposals, so get the word out to your friends in FWS.

RGEP News

Dr. John D. Thompson has accepted the position of coordinator of the Resource Grade Evaluation process for the biological sciences in the U. S. Geological Survey. Dr. Thompson will report for duty on Monday, September 8, 2003, and be headquartered with the science staff in Reston, Virginia.

Scientists are being encouraged to participate in the RGEP review process. It requires some time commitment to act as the primary reviewer for two scientists, however, the time is well spent learning about other research within USGS, and also the difference between a good and not-so-good RGE packet. This is important activity for every IV-factor scientist. Regretfully two chemists were not reviewed recently due to a lack of people willing to serve as a primary reviewer. Please give the RGEP process your support. We need to help our colleagues as well as ourselves by participating, by being thorough in our reviews, and allowing everyone to be reviewed according to the same timetable. RGEP will cover the travel costs and all panels are being held in Reston this year.

Research Briefs

The following excerpts represent current research at S.O. Conte Anadromous Fish Research Center, USGS/Leetown Science Center, Turners Falls,MA 01376 USA and were presented at American Fisheries Society 2003 Annual Meeting. Contact Steve Rideout, (Stephen G Rideout@usgs.gov) Laboratory Director for more information (413/863-3803).

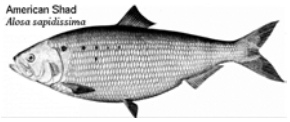
Physiological smolt status of wild Atlantic salmon in Maine and its relation to declining populations. (Stephen D. McCormick and coworkers)
Changes in smolt physiology (gill Na,K-ATPase activity), are a prerequisite for survival in seawater. This study examined fish in the Narraguagus river from 1998-2002, the Pleasant river in 1999, the Dennys river in 2002 and Sheepscot river in 2002. Results from 1998-2001 indicated that smolt development was moderately compromised in the Narraguagus river with substantial variation from year-to-year. In spring 2002 smolt physiology in fish from the Narraguagus and Dennys river were severely compromised for most of the smolt migration, suggesting that adult survival from this year class of smolts is likely to be very low. Elevated acid and aluminum and/or the presence of endocrine disrupting chemicals may be responsible for this compromised smolt development.

Life history consequences of variation in stocking date for stream-dwelling Atlantic salmon parr. (Benjamin Letcher and coworkers)
The effect of variation in the timing of stocking in a single stream (the West Brook, Whately, MA USA) on growth, life history variation and survival was investigated. Early fish were consistently heaviest and incubator fish were the lightest. A laboratory study indicated that competitive interactions among groups may play a large role in maintaining size differences among groups. Surprisingly, the size differences among groups did not result in variable proportions of mature parr among groups. Based on a single stream for a single cohort, the results indicate that timing of stocking or emergence can have substantial effects on size and abundance, but may not influence incidence of parr maturity.

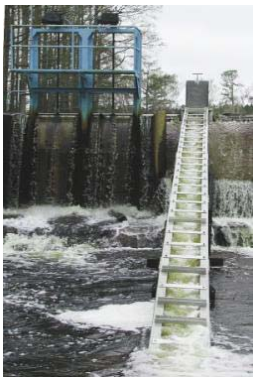
Life History Studies on Migratory Fish in the São Francisco River, Brazil. (A.L. Godinho and B. Kynard)
A characid, the curimbatá (Prochilodus marggravii) were studied. Laboratory tests found that curimbatá males make a unique drumming call just prior to spawning. Monitoring of curimbatá calls during 2002-2003 in the São Francisco River found calls were concentrated at the Abaeté River mouth and only occurred during periods of high discharge from the Abaeté River. Monitoring for curimbatá calls at other tributaries found a similar result, suggesting that spawning areas can be easily located using hydrophone surveys.

Wintering location and habitat of Connecticut River shortnose sturgeon. (Micah Kieffer and Boyd Kynard)
Wintering location and habitat of shortnose sturgeon, Acipenser brevirostrum, upstream of

Holyoke Dam (river km 140) was studied from 1993 to 2003. Only 3.9 % of the 143 tracking locations during 10 years occurred outside one of the known concentration areas. Individuals were observed during multiple winters and used the same site, year after year, and rarely changed sites during the winter. Underwater video of the physical environment showed fish occurred over a wide range of water depths (1.8 - 9.2 m), but used a limited range of bottom water velocities (0.2 - 0.4 m/s) and substrate (100% on sand). Selection of bottom habitat with a low velocity may be crucial for fish to conserve energy during the five winter months of limited activity and foraging.



Repeat spawning of American shad *(Alosa sapidissima)* in the Connecticut River mainstem based on returns of marked individuals.
(T. J. Sullivan and coworkers)
Rates of repeat spawning vary among populations of American shad. In the Connecticut River, an estimated 38% of returning shad are repeat spawners. PIT tags were put in 2,319 Connecticut River shad and were monitored in subsequent years. Of the 44 repeat spawners observed (1.9% of all fish tagged), 91% returned the year following tagging. One female returned in three consecutive years. Return rates were higher for males (2.6%) than for females (0.8%). The distance migrated upstream during the year of tagging appeared to be inversely related to the likelihood of fish returning in subsequent years. Males that returned to repeat spawn were significantly smaller than males that did not return, while there was no difference in length among females. There did not appear to be a high degree of spawning site fidelity from year to year within a 59 river-km section of the Connecticut River.



Stress and Fatigue During Fish Ladder Migration Of Adult American Shad, (*Alosa sapidissima*)
(Darren T. Lerner and coworkers)
Fish ladders were often designed without regard to the physiological and behavioral ability of migrating fish. Physiological measures of stress and fatigue in American shad were measured in this study. Plasma cortisol concentrations were three to five times higher in fish captured at the top of the ladder as compared to those captured at the entrance. Plasma glucose was 50% greater and plasma lactate three to six times greater than ladder-naïve animals. Of the plasma ions only potassium levels increased significantly as fish progressed up the ladder. Plasma chloride and sodium levels were lower in fish in the ladder than those captured at the base of the ladder. We hypothesize that the high levels of stress and fatigue is linked to poor passage through the fish ladder.

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Never neglect an extraordinary appearance or happening. It may be -- usually is, in fact -- a false alarm that leads to nothing, but it may on the other hand be the clue provided by fate to lead you to some important advance.
--Sir Alexander Fleming (1881-1955), British microbiologist who discovered penicillin.

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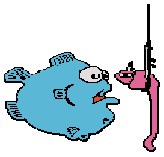

Conferences and Meetings of Interest

Sept. 10-13, 2003: 93rd Annual Meeting of the **International Association of Fish and Wildlife Agencies**: Celebrating the Leopold Legacy, Madison, WI. For details, call 1-800-624-4960, or visit http://www.iafwa.org/2003%20Annual%20Meeting.htm

Nov. 4-8, 2003: **North American Lake Management Society** 2003: Protecting Our Lakes' Legacy, Mashantucket, CT. For details, call 608-233-2836, write nalms@nalms.org, or visit www.nalms.org.

Job Announcements

Supervisory Fishery Biologist, Cook, WA

The Supervisory Fishery Biologist directs all aspectsof the large, complex research program at the Columbia River Research Lab in Cook, Washington. The incumbent supervises scientists and oversees the administrative staff and the maintenance of laboratory facilities and research systems.

Announcement Number: WR-2003-0233

Vacancy Description: Supervisory Fishery Biologist, GS-0482-14 (CS-DEU)
Open Period: 07/07/2003–09/15/2003
Series/Grade: GS-0482A-14/14
Salary: $79,344 to $103,150
Promotion Potential: GS-14
Hiring Agency: INTERIOR, Geological Survey *Duty Locations:* 1 vacancy in Cook, WA *Remarks:* This vacancy is being readvertised. If you previously applied to this announcement last May, you do not need to reapply. For more information, contact Cathy Shahan, 650-329-4109, or write cshahan@usgs.gov

Center Director for the Forest and Rangeland Ecosystem Science Center, Corvallis OR

The selectee will serve as the Center Director for the Forest and Rangeland Ecosystem Science Center (FRESC) and will be responsible for the management of a broad, multi-disciplinary program of biological research, inventory and monitoring, and information management.

Announcement Number: WR-2003-0269

Vacancy Description: Supervisory Biologist, GS-0401-15, (spb-DEU) *Open Period:* 07/01/2003–08/01/2003 *Series/Grade:* GS-0401A-15/15 *Salary:* $93,330 to $121,330 *Promotion Potential:* GS-15 *Hiring Agency:* INTERIOR, Geological Survey *Duty Locations:* 1 vacancy in Corvallis, OR
For more information, contact Sandy Borges, 650-329-4954; sborges@usgs.gov


Useful English System Conversions/Units:

* Ratio of an igloo's circumference to its diameter = Eskimo Pi
* 2.4 statute miles of intravenous surgical tubing at Yale University Hospital = 1 I.V. League
* 2000 pounds of Chinese soup = Won Ton
* 1 millionth cup of mouthwash = 1 microscope
* Speed of a tortoise breaking the sound barrier = Mach Turtle
* Time it takes to sail 220 yards at 1 nautical mile per hour = knot-furlong
* 365.25 days of drinking low-calorie beer because it's less filling = 1 light year
* 16.5 feet in the Twilight Zone = 1 Rod Serling
* 1/2 large intestine = 1 semicolon
* 1000 aches = 1 megahertz
* Weight an evangelist carries with God = 1 billigram
* Basic unit of laryngitis = 1 hoarsepower
* Shortest distance between two jokes = a straight line
* Time between slipping on a peel and smacking the pavement = 1 bananosecond
* 453.6 graham crackers = 1 pound cake
* Given the old adage "a journey of a thousand miles begins with a single step," the first step of a one-mile journey = 1